Comparison of Observations

Maurer02 vs Daymet2.1
(not completely fair at this point: 1971-2000 vs 1980-2009)

check later on NCPP for 1980-2009 comparison
Some Discussion Points

• What metrics should be used for comparing observations?

• What distributional metrics could readily be used? Is anybody playing with that? How test significance efficiently?

• How related are the underlying processes for temperature and precipitation? ... how about other fields?

• Observational climatologies: How much are they biased by internal variability?

• How useful is a “food label” indicating quality of use to one application but not another? Difference in obs vs models?

• Probabilistic observations: how would we construct them, and would there be a use for them? Weather generators?
Does Dynamical Downscaling Matter for Climate Change Adaptation on the Colorado River?

Joseph J. Barsugli (CU; Western Water Assessment)
Linda O. Mears (NCAR)
Jim R. Prairie (Reclamation)
Imtiaz Rangwala (UCAR PACE Post-doc; WWA)
Levi D. Brekke (Reclamation)
Justin Briggs (WWA)

Thanks to: Carly Jerla, Andy Wood, Ben Harding

Effects of downscaling method (Dynamical vs. Statistical) on hydrological projections:

Conceptual Framework

1. Bias Correction (of monthly T-avg and Precip) based on Maurer Climatology
2. Spatial downscaling to 1/8th degree
3. Temporal disaggregation to daily data

Lake Powell end-of-December Water Elevations

Effect of downscaling method (Dynamical vs. Statistical) on hydrological projections: Conceptual Framework

- CGCM3
- CGCM3+RCM3
- CGCM3+CRCM

Downscaling Choices and Consequences
...we don’t know which approach is best...
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Temperature Trend 2006-2060
(40 member ensemble CESM)

Deser et al. 2012
Interpreting an Ensemble

Ensemble: pixels are independent point-wise expected values

Requirement: sampling from same “process”

Images courtesy J. Salavon
Regional Downscaled Model Projections

Source: ClimateWizzard.org
Data: CMIP-3 (Maurer et al.)
Solar/Wind Potential Project NREL

Target
380 regions, 4 seasons, 4 daily periods

Observations

ReEDS Regions

38 NSRDB sites (in black) and 2 tall-tower sites (in red)
Self-organizing Maps:
Reanalysis as the target, GCM/RCMs as samples

Advantages:
full 3D fields, bias corrected, realistic (weather) pattern based, interpretable, probabilistic
Self-organizing Maps: Frequency evaluation of SOMs between Reanalysis and RCMs

Change 2060 annual

Change 2060 seasonal
Some Discussion Points

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